

REMARKS

Claims 1-60 are pending, and are rejected as being anticipated under 35 U.S.C. §102(e) over the reference of Burnette, et al., U.S. Patent Application Number 2003/0228023 (Burnett, et al. '023).

Rejections Under U.S.C. §102(e)

The Examiner rejects the pending claims over the reference of Burnett, et al. '023 seemingly based primarily upon the fact that the Burnett, et al. '023 reference discusses and teaches the utilization of two individual microphones, wherein one microphone is indicated as a signal, or speech, microphone, and the other microphone is indicated as a noise microphone. Such a multiple microphone system of the Burnett, et al. '023 reference is utilized within a de-noising system, essentially to remove extraneous noise, or to suppress noise in order to provide clean speech signals.

The present invention, on the other hand, is directed to an apparatus for detecting user speech for automatic speech recognition utilizing speech recognition circuitry. Audio signals from the microphones are forwarded to the speech recognition circuitry, which processes those audio signals, and recognizes user speech, such as by recognizing the individual words, phrases, and other components of that speech. The multiple microphone system of the present invention is not used to suppress noise or to clean up noise in the audio signals generated by the microphones as taught in Burnett, et al. '023. Rather, based on the audio signals generated by the multiple microphones in invention, processing circuitry makes the

determination to selectively forward the audio signals from one of the microphones to the speech recognition circuitry only when the audio signals indicate that the user is speaking. More specifically, the processing circuitry processes the audio signals and compares characteristics of those audio signals to a baseline. Only when those audio signals vary from the baseline more than a threshold amount, does the processing circuitry selectively forward the audio signals from a first microphone to the speech recognition circuitry for further processing and recognizing user speech.

To anticipate a claim under §102(e) of the Patent Statute, it is necessary that the prior art teach each and every one of the claimed elements. The Burnett, et al. '023 reference does not, in any way, teach or suggest an apparatus, or system, that is utilized to affect speech recognition in a speech recognition, or voice-driven, environment. Certainly, the Burnett, et al. '023 reference does not, in any way, teach or suggest processing circuitry that selectively forwards audio signals to speech recognition circuitry only when a determination is made that the user is speaking. Therefore, the Burnett, et al. '023 reference cannot legally anticipate the pending claims under §102(e), because that reference does not teach each and every one of the elements set forth in the claims.

More specifically, the present invention is directed to use in a voice-driven environment wherein voice and speech are utilized to complete tasks, gather data, and otherwise interface with a processor of some kind, such as in a central computer system or device, for example. Because such voice-driven systems are utilized in noisy environments, various extraneous

noises might be captured by a microphone, and may actually be wrongly interpreted as actual speech by the speech recognition process. This is particularly a problem with environments involving PA systems, which are often very loud, and actually include human speech as a component thereof.

As noted in the Background Section of the currently-pending application, one approach to addressing such extraneous noises has been noise-cancelling microphones in a system, which are utilized to cancel the effects of extraneous sounds. The cited Burnett, et al. '023 reference, for example, addresses noise cancellation. However, such noise-cancelling systems and microphones often do not provide sufficient signal-to-noise ratios to be particularly effective, as noted in the Background Section of the present application. This is a problem in voice-driven systems, and is certainly one that the Burnett, et al. '023 reference fails to address in a sufficient manner.

The pending claims have been amended to further clarify their scope. The Burnett, et al. '023 reference does not teach or suggest all the elements set forth in those amended claims, and thus, would not anticipate those claims under §102(e) of the Patent Statute.

Specifically, Claim 1 recites an apparatus for detecting user speech for automatic speech recognition. A first, and at least a second, microphone are utilized with a first microphone capturing a greater proportion of speech sounds from a user. Processing circuitry is operable to process the audio signals, and to compare characteristics of the audio signals to a baseline. The Burnett, et al. '023 application does not, at all, discuss or teach

processing circuitry to compare characteristics of the captured audio signals of the microphones to a baseline. Claim 1 further recites speech recognition circuitry for further processing the audio signals, and recognizing user speech in the audio signals. Finally, Claim 1 recites that the processing circuitry is configured for selectively forwarding the audio signals from the first microphone to the speech recognition circuitry only when the audio signals vary from the baseline more than a threshold amount.

As the Burnett, et al. '023 reference is only directed to de-noising, and is particularly directed to, the types of microphones that might be used for de-noising and their respective positioning, that reference clearly does not teach processing circuitry that compares characteristics of the audio signals to a baseline to determine if those audio signals vary from the baseline more than a threshold amount for the purposes of selective speech recognition. Furthermore, the Burnett, et al. '023 reference does not teach, or suggest, to a person of ordinary skill in the art, processing circuitry that is configured for selectively forwarding the audio signals from the first microphone to speech recognition circuitry only when the audio signals vary from the baseline more than a threshold amount. As such, Claim 1 cannot be anticipated under §102(e) by Burnett, et al. '023, because the reference fails to teach all of the claimed elements.

The Examiner makes reference to some paragraphs within the Burnett, et al. '023 reference for teaching the concept of a baseline, and determining whether signal characteristics exceed a baseline variation by a pre-determined amount. Specifically, the Examiner recites to Paragraphs 43,

51, 88, and to element 106. However in reviewing those specific paragraphs of the Burnett, et al. '023 reference, none of those paragraphs, in any way, teach those recited elements. For example, Paragraph 43 merely makes reference to voice activity detection (VAD) device, wherein representations might be utilized to indicate that speech has occurred, or speech has not occurred. There is no discussion whatsoever in that paragraph with respect to comparing characteristics of the audio signals to a baseline, nor is there any teaching regarding determining if the audio signals vary from the baseline more than a threshold amount.

Similarly, with respect to Paragraph 51, that paragraph merely recites the various VAD devices that might be utilized. Finally, Paragraph 88 simply notes how a VAD device might be a component of a noise suppression system. Accordingly, none of the references at all discuss what is claimed.

Applicants note that several of the paragraphs (e.g. Paragraphs 51, 88) mention related U.S. Patent Application Serial Number 10/383,162, which is published as US2003/0179888 (Burnett, et al. '888). Although not specifically cited in the Office Action, the Burnett, et al. '888 reference was also studied, and also fails to teach the elements recited in Claim 1. The Burnett, et al. '888 reference discusses other components of the noise suppression and communication system set forth in the Burnett, et al. '023 reference that is cited by the Examiner. Generally, the Burnett, et al. '888 reference is directed to VAD devices and methods that may be utilized for then selecting what de-noising or noise removal algorithms might be used in the overall noise suppression system. However, that reference also does

not teach the invention, as recited in Claim 1, which includes processing circuitry that selectively forwards audio signal from a first microphone to speech recognition circuitry only when the audio signals vary from a baseline more than a threshold amount. As such, the Burnett, et al. '888 reference also would not anticipate Claim 1, under §102(e).

The Examiner does make reference to speech recognition in rejecting originally-pending Claim 3, which has now been cancelled. However, the Examiner refers to Paragraph 40 in the Burnett, et al. '023 reference. While Paragraph 40 notes that the physical microphone configuration set forth in that patent reference might be used for various applications such as communications, speech recognition, and voice-feature control of applications and/or devices, such a teaching in Burnett, et al. '023 reference is simply a mention of other areas where the specific microphone layouts and types of microphones of Burnett, et al. '023 , might be utilized. Utilizing those taught microphone layouts, such as the Burnett, et al. '023 combinations of unidirectional and omnidirectional microphones for noise suppression, in a speech recognition system, does not provide any teaching to a person of ordinary skill in the art regarding the limitations set forth in Claim 1 with respect to processing circuitry that processes audio signals to compare characteristics of the audio signals to a baseline, and that is configured for selectively forwarding the audio signals from a first microphone to speech recognition circuitry only when the audio signals vary from the baseline more than a threshold amount. Therefore, the mere mention of speech recognition in Paragraph 40 does not provide a teaching

to a person or ordinary skill in the art such that the invention recited in Claim 1 would be anticipated under §102(e). Accordingly, Claim 1 is allowable over the cited art.

Dependent Claims 4 – 12 each depend from Claim 1, and include the limitations set forth therein. Furthermore, each of those claims sets forth a unique combination of elements, which is not taught by the Burnett, et al. '023 reference. Accordingly, those claims are also in an allowable form.

With respect to the remaining Claims 14-60, the Claims 14, 22, 31, 44, and 52 are all independent claims that have been amended, and include limitations along the lines of those set forth in Claim 1, as discussed above. The Examiner indicates in the Office Action that Claims 14-60 are of similar scope and context to Claims 1-13 and are rejected under similar rationale as Claims 1-13 were rejected.

Accordingly, for the same rationale as discussed above with respect to Figure 1, Applicant submits that those claims that are still pending within the group of Claims 14-60 (Claims 15-16, 23, 28, 30, 35, 38-39, 45-46, 56, and 58-60 are cancelled), are not anticipated under §102(e) by the Burnett, et al. '023 reference, and thus, are also in an allowable form.

Applicant submits that the currently-pending claims are allowable over the cited art of record, and respectfully request an indication of their allowability at the Examiner's earliest convenience. If any issues remain in the Application, upon entry of this Amendment, that might be handled in a more expedited fashion through a telephone call, the Examiner is certainly

encouraged to telephone the Applicant's undersigned representative to discuss such issues and/or the claims involved.

Applicant is submitting the fee due for the two-month extension of time with this response. If any additional fees are necessary, the Commissioner may consider this to be a request for such and charge any necessary fees to deposit account 23-3000.

Respectfully submitted,

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